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On the Defects, with reference to the Plan of Construction and Ventilation, of most of our Hospitals for the reception of the Sick and Wounded.

By Mr. JOHN ROBERTON.

[Read March 20th, 1856.]

BY an apt and beautiful form of expression, the air we breathe is called in the Scriptures "the breath of life;" when we cease to respire it, we die. If we should inhale some other kind of air, or atmospheric air much contaminated, this would prove to us, not "the breath of life," but that of sickness or of death. How significant the words! The atmosphere is God's common gift, as free to the peasant as to the prince; and yet, strange to say, in a large proportion of human dwellings, and of vessels as they navigate the sea, the admission and circulation of the air are unduly limited and impeded; and not seldom, the supply, such as it is, is allowed to become so impure as actually to generate disease.

The ignorance as to the indispensable necessity of air for the maintenance of life would be incredible, did we not so often witness it in connexion with its deplorable consequences. I will mention two or three facts by way of example. I happened on one occasion to be at the door of an inn in a country town, when a stage coach drew up, and the passengers alighted for breakfast. One of them, a gentleman, before going within, called to the guard to let out his dogs; which, on some account—perhaps the convenience of his fellow passengers—he had lodged behind, in the boot. The guard accordingly opened the boot, and, to the astonishment of the gentleman, dragged forth his dogs, a pair of fine pointers, dead. It had not, seemingly, occurred to the owner or to the guard, that animals cannot exist without a proper supply of air. Had the side walls of the boot, near the roof, been perforated by rows of holes, one row running parallel to the other on opposite sides, the dogs would have lived, because their prison, small though it was in cubic air space, would, in that case, have been in communication with the external atmosphere, and have partaken of its currents; but the air in the boot, remaining without renewal, was speedily robbed of its oxygen, and at the same time, it acquired from the lungs of the animals, the qualities of a deadly poison. Again, in the winter of 1848, the deck passengers of an Irish steamer, the "Londonderry," were ordered below by the captain, on account of the boisterous state of the weather, and the hatches closed; the consequence was, that of 150 persons, no fewer than 70 were suffocated by morning. And quite recently, as we learn from a letter in an Oriental newspaper, "The China Mail," an American ship, named "The Waverley," from Amoy, bound to Lima, with 442 coolies on board, put into Manilla; and, as dysentery prevailed among the coolies, the vessel was put under quarantine. Some disturbances having in consequence of this procedure occurred on deck, the mate and crew forced the coolies into the hold and battened down the hatches; when opened, about fifteen hours afterwards, 251 were found dead from suffocation. A late writer on ventilation does not hesitate to assert, that could we suppose a highway formed on the bottom of the sea, between the Gulf of Florida and the Gold Coast, it might be covered, from end to end, with the carcasses of those Africans who were suffocated in the holds of Guinea-men, and then thrown overboard.*

It is not enough, however, that there be atmospheric air to sustain life, and no more; it must be *in excess* so to speak, else the air emitted from the lungs will at length so deteriorate the other, as to cause a variety of injurious effects. Here, again, I may illustrate my meaning by an example. Once when inspecting a workhouse I asked to be shewn the nursery, and was taken down a flight of steps into a deep cellar, where were a number of infants, some at the breast, and others hand-fed; but all, without exception, irritable, pallid, and miserable. Nor can we doubt, I think, that the brawls and the gross intemperance common among persons inhabiting cellars, the honeycomb cottages in narrow courts and lanes, and over-crowded and unventilated tenements of other descriptions, are owing, in no small degree, to those feelings of discomfort which are the effects of impure air.

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* Bernan on Warming and Ventilation. 12mo. 1845.

But graver consequences still than these arise from vitiated air. Of all the aërial poisons, none, perhaps, is much more hurtful to man than his own expelled breath, when detained long around him and breathed again.* Not long ago, I had occasion to inspect the dormitories in a school, in each of which fourteen boys had for some time slept, with a cubic air space for each boy of barely 140 feet. Ere long, the ill effects naturally to be expected, appeared; seven of the boys and two of the masters sickened of typhus; and the school had for a time to be broken up.

It may, perhaps, be conceded, that a number of our gaols are now tolerably salubrious, but it was otherwise not long ago; and if we advert to what, from a late report, is found to be the condition of gaols in British India, we shall discover the most appalling results on the health and life of the prisoners, owing to a disgraceful, nay, criminal, neglect of ventilation. This report occurs in a work on the Public Health of Bengal, by Dr. Mackinnon, published in 1848. The number of prisoners in the gaols is usually about 40,000, chiefly natives; and the annual average mortality of the whole had recently been one in ten, rising in some instances to 26 per cent. or more than one in four; a rate easily accounted for, when it is known that in no instance is there an allowance of more than 300 cubic feet of air space for each individual; whilst, in some instances,

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* This idea is Dr. Arnot's.

70 cubic feet is the murderous average.* To arrive at even some faint conception of the cruelty of this deprivation of an adequate supply of air, it is necessary to know that the daily actual *consumption* of air by adults, has been found, by experiment, to vary, according to circumstances, from 306 to 398 cubic feet; that much of what is not consumed, is, as before stated, defiled by mixing with the products of respiration; and that the smallest cubic air space that can safely be assigned for one individual, unless there be arrangements for a continual renewal of the air, is from 800 to 1000 cubic feet. When we speak of a rate of mortality in gaols so high as the foregoing, we ought—if, indeed, imagination can portray them— to think of the antecedents to these deaths, I mean the feelings of misery in which the prisoners are compelled to pass their existence; for it may well be said, that in such abodes *they* are the most fortunate who the soonest die.†

The defects in the construction and ventilation of such buildings as schools and gaols, where persons in a state of health pass the whole or only a portion of their time, though a subject of the greatest importance, does not lie within the scope of my present purpose; and I have cursorily adverted to it, only by way of introduction to one of a far different nature,—the construction and ventilation of buildings destined for the reception and treatment of the sick and wounded,—a subject, I say, of a far different nature; for I shall be able to shew that, in the construction and ventilation of Hospitals, if they are to subserve the end for which such institutions are professedly opened, we must have regard to some things that do not much concern us when planning other kinds of buildings.

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* Carpenter's Principles of Human Physiology. 4th edition, page 554.

† I beg here to refer my readers to the Chapter "On Respiration," in Dr. Carpenter's Physiology, a chapter which ought to be printed in a cheap form and widely circulated, for general enlightenment on matters of the greatest moment, concerning which mankind, as yet, are in a state of surprising ignorance. The recent work of Dr. Arnot, "On the Smokeless Fire-place, Chimney-valves, and other means, old and new, of obtaining Healthful Warmth and Ventilation," 8vo. 1855, is likewise well deserving attentive perusal.

It is well known to the medical profession, that most of our Hospitals are, at times, unhealthy; insomuch that patients carried thither, instead of obtaining a cure, grow worse; and, occasionally, owing to the breaking out of an infectious malady—known by the name of hospital gangrene, die rapidly in considerable numbers. But even should this scourge not show itself, and there be no very high rate of mortality, the health of the inmates will often deteriorate, so that wounds, fractures, burns, ulcers, and other forms of surgical disease, are cured, if at all, only after great lingering and suffering,—lingering and suffering dependent, in general, on the insalubrity of the wards; in other words, the absence of a pure atmosphere.

I have long thought that in constructing Hospitals we have been in the habit of confounding together two things widely different, namely, *sick wards* and *dormitories;* wards, where the sick and wounded lie continuously throughout the day and night, with dormitories occupied by the healthy for only eight or nine hours in the twenty-four;—of confounding wards—where cubic air space, though highly important, is a secondary consideration to the getting rid of fœtid and pestiferous exhalations by a continual renewal of the atmosphere—with dormitories, in which ample cubic air space is all that is required. It has been owing to ignorance or inattention to this essential difference between wards for the sick and dormitories for the healthy, that we have few Hospitals in England that are not insalubrious whenever they chance to be crowded; and which, when crowded with such cases as burns, compound fractures, and extensive ulcers, are often the abodes of death, occurring in forms most humbling and mortifying to the pride of surgical science; since the surgeon, in such circumstances, is aware that the poor sufferers have been carried to a public institution to their destruction; and that had they been treated by him in their own homes, howsoever humble these might be, the chances of recovery would have been greater.*

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* I have said that the cubic air space of a ward, though a matter of high importance, is secondary to another consideration. I regret to find that the air space for each bed in a number of our provincial Hospitals is not half what

But there is another point that has been hitherto overlooked, as to our English Hospitals; and, mainly, from inattention to the essential difference, above mentioned, between sick wards and dormitories: I refer to arrangements calculated to prevent the creation of what may be denominated *an Hospital atmosphere,* which arises from the wards communicating with one another by passages and stairs. It is owing to this kind of intercommunication that, if a foul state of the air happen in only a single ward, such foul air spreads and speedily pollutes the entire building. In a few of our Hospitals the plan of construction is good; in the majority, bad; but in not one of them that I have seen, is the plan such as to render impossible the formation of an *Hospital atmosphere;* yet this all-important object has been attained on the Continent in several instances, where we have a plan of construction at once ingenious and perfectly successful,—a plan that, when first seen and understood, never fails to excite feelings of pleasure and admiration. I now allude, more particularly, to the Bordeaux Hospital, the most attractive, altogether, that I have examined; although it must be admitted that the Saint John's Hospital, Brussels, the new Lariboissaire and the Beaujon Hospitals, Paris, are built after the same plan, and are, perhaps, not very much inferior. The peculiarities of these buildings, the points wherein they differ from our Royal Infirmary, for instance, I will endeavour to make plain by means of a lithographed sketch of the ground plan of the Bordeaux Hospital.*

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it ought to be. In a clean and in other respects well-ordered Hospital in a neighbouring town, which I recently visited, the cubic air space in some of the wards was little over 600 feet for each bed; the average per bed for the whole of the wards being only 715 feet. I apprehend that the cubic air space per bed ought never to be less than 2000 feet.

* Certain new wards in St. Thomas's Hospital, Southwark, are, I am informed, on an excellent plan; but as I have not had an opportunity of inspecting the plan, I can only make this reference to it. I have personally examined the Brussels Hospital, and the Beaujon and Lariboissaire Hospitals, Paris. The latter, which has only been opened about two years, is well worthy of a visit. My friend Mr. Richard Johnson, who was recently in Paris, sends me an interesting account of the Lariboissaire, and pronounces it to be "truly a palace for the sick."

Let me first, however, describe our own handsome Infirmary, which may fairly represent a number of our larger Hospitals. The plan of the interior differs very little from that of a vast hotel: the building forms three sides of a square, and, with the basement, consists of three storeys. The basement is occupied by the Board, the accident, and the out-patients' rooms, the library, and apartments for the various officers and students. On reaching the first storey, the plan is at once obvious. A corridor is seen dividing the floor longitudinally, so that the wards, entered from the corridor on either hand, have, necessarily, windows on one side only, and a dead wall—the wall of the corridor—on the other. This arrangement prevents a thorough circulation of the external atmosphere, such as can always be had where the ward has windows facing one another on the opposite side walls. This is one evil; but another evil still greater is the facility with which—when one of the wards of a particular storey is foul—the corridor conducts the polluted air to all the wards opening from it; whilst, again, the grand stair and the several side stairs, by connecting the corridors in the different storeys, produce the ill effect I before mentioned, a general foulness, an Hospital atmosphere. Let there be one foul ward, and a plan of construction such as now described, and it inevitably follows, that the foul air will circulate throughout, and pollute the entire building.

The Bordeaux Hospital is constructed in a totally different manner; so different that, to one unacquainted with it, the idea would hardly occur. To myself it was novel, and so obviously admirable, in the two-fold sense of securing thorough ventilation, and rendering impossible the formation of an hospital atmosphere, that I was delighted. Novelty has a charm of its own, but when this is combined with the highest utility, the feeling of pleasure is all the greater.* Standing in an open space of ground, called the Place du Fort du Hâ, we look on a fine building, the frontage extending, perhaps, 140 yards. Passing in at the centre gateway, we behold a beautiful court, of about a quarter of an acre, planted with evergreens and flowering shrubs, surrounded by a carriage drive; and, beyond the drive, by a light arcade or ambulatory which serves to connect, on the two sides facing each other, a succession of pavilions or tiers of buildings standing parallel and having the ends towards the square. We step under the arcade, and above a door opening into the basement at the end of one of these pavilions we see the words "Salle Seconde." We enter, and discover a ward about 140 feet long, 30 feet wide, 19 or 20 feet high, having tall, narrow windows, directly facing each other on the opposite side-walls, containing thirty-eight beds—nineteen on either side, and each bed—the bedstead small and of iron—hung round with white dimity curtains, but having no tester.* Near the entrance is a room for the sisters or nurses, and at the extremity of the ward, a door on the right hand leading to clean, well-ventilated closets, and a door on the left to a spacious lavatory.

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* I copy the following notice on the face of the published plan, regarding the origin of this noble institution—"Grand Hospital de Bordeaux, dont la construction a été autorisée le 8 Juin, 1825, par une ordonnance du Roi."

After surveying the general aspect of the ward, we feel tempted to look out at one of the windows, and are surprised to see a beautiful garden, planted with vines and roses—the garden surrounded by a neat footpath. We cross the ward, to discover what there is on the other side, and find a garden resembling the one we have just seen. The patients, whenever they chance to approach a window on either side, look into a beautiful garden.

Having surveyed one ward, we ask the way to the next, and receive for reply "There is only one door; you go out at the door by which you entered." Thus we discover the important fact, that as we entered this ward from the open air, so must we emerge from it again into the air. Once more under the arcade, we proceed towards the next pavilion, and find that, extending between the pavilion we have left and this one, is a light iron railing, through which we see one of the gardens already spoken of. There is a gate—we enter: the garden is in length the same as the ward, in breadth about fifty feet. On stepping into the ward next in course, we find it a copy of the former; and now we come to perceive that, as each pair of pavilions has a garden intervening, the windows of the wards look into gardens. Having examined the wards on the basement story of each of the separate pavilions, five in number, on this side of the square, we ask how we are to reach the wards in the second story, and are pointed to a stair at the end of the arcade, which winds up to a like open arcade above, out of which the wards are entered in the same manner as below. Every ward, I repeat, has one—only one door. You enter from the open air, and when you seek to return, your exit must be by the same door again into the open air. It follows, of course, that each ward is itself *a separate hospital*, having no communication with the other wards; so that if we were to suppose one of these to be crowded with the worst kind of surgical maladies for causing foulness, the foul air could not find a passage into any other ward—an hospital atmosphere would be impossible. I need hardly say, however, that the ventilation by windows being such as I have described, no ward need be allowed to become foul.

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* These measurements are probably not quite exact. Moreover, as will be seen by the ground plan, the wards are not all of the same length; several of them are for children between the ages of six and fourteen years; and there is a small maternity ward.

Another advantage, not to be overlooked, attaches to this plan of construction; there is no need to limit the size of the hospital or the number of beds. In England, where nine-tenths of the hospitals are on the plan of an hotel or a large dwelling house, we are afraid to open a large hospital. It has long been a painful conclusion of experience, that the larger the hospital, the higher the rate of mortality. Our Infirmary has little over 200 beds, rarely that number occupied, and yet, when the house is pretty full, the health of the patients, it is said, soon deteriorates; whereas, on the continent, several of the finest hospitals accommodate from 600 to 800 patients. That in Bordeaux has 710 beds for the ordinary class of patients, and eighteen beds for paying patients. The number of patients of both classes in the wards, when I was there in 1855, was about 550. In an hospital such as this, if you were only to extend sufficiently the size of the court, and to multiply sufficiently the number of the pavilions containing the wards, thousands of sick might be lodged without inconvenience—without the slightest risk of generating an hospital atmosphere.*

I have admitted that the construction of some of our Hospitals is tolerably good. In these, the floors are not divided by corridors, but every ward occupies the breadth of the floor, and has windows on the opposite side walls, through which, when they are thrown open, currents of air freely circulate and purify the apartment; an immense advantage this, it will be admitted, over the plan of our own Infirmary, in which, as we have seen, the wards, with windows on one side only, have not the benefit of transverse currents. Here I would express myself without any reserve; when a ward has windows on one side and a dead wall on the other, it cannot, generally speaking, be healthful; the construction is after a method radically bad. But even in the best of our Hospitals, (and one of them—the Middlesex—we shall find is a model for its ventilation,) the plan of the building allows the generation of an Hospital atmosphere.

By the ventilation of a ward, it will have been observed that I mean the admission into and circulation through it of the external atmosphere; not, necessarily, at all times by open windows, but, when circumstances require, through perforated plates of zinc, having the apertures so small as to rob the air currents of what in them is disagreeable or hurtful to the sick. I have little faith in scientific ventilation, so called,—whether the downward mode, the upward mode, or the circuitous mode. I should almost as soon think of looking for my daily supply of water for purposes of ablution, from the scientific formation of it out of its aëriform elements by galvanic agency, as of depending upon such refined expedients for the purity of a sick ward. If a ward is to be kept perfectly sweet,—*the air must flow through it in correspondence with the natural movements of the atmosphere without.* Let the windows of the opposite side walls — tall windows, they ought to be tall, reaching near to the ceiling—be thrown open; and, instantly, the air enters at one side and escapes at the other, the side of admission being determined by the direction of the wind at the time. Sometimes the air is entering by the windows on a particular side—the wind shifts, and now it enters on the other side and escapes by this. There is an unceasing flow of the atmosphere, mostly parallel to the surface of the earth, which fans and purifies every object it is permitted to embrace. A perfectly stagnant condition of the external atmosphere — if it ever exist — is extremely rare. I therefore repeat, that curious and refined modes of ventilation, which may answer for entertaining rooms, public offices, and other kinds of apartments occupied by persons in a state of health, fail when applied to an Hospital, where effluvia from the bodies of the sick, animal matter from their breath, and the fœtor from ulcers, wounds, burns, and from vitiated excretions, combine to pollute the atmosphere, so as no ventilation can dissipate, other than Nature's,—I mean the ceaseless, it may be *imperceptible,* flow of the external air through the wards. *This mode, and no other, is worthy the name of Hospital ventilation.*

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* From a notice in "Le Siècle," of May 14th, 1855, it appears that a new Hotel Dieu is likely to replace the present old unwholesome structure. The new edifice will stand—as the old, in part, does—in the Ile de la Citè, on a triangular plot of ground of about five and a half acres, between the Rue D'Arcole and the Quai Napoleon, and it is to lodge as many patients as the old Hotel Dieu, viz. 800, in wards of thirty-six beds each. From an allusion to the Lariboissaire Hospital, I infer that the contemplated Hotel Dieu is to be constructed after the same plan; the site, with the houses on it, is to cost about ten millions of francs, and the new buildings from five to six millions more!

The windows in a ward, not only for the sake of ventilation, but the admission of light, ought to be TALL. In most of our Hospitals—in all the provincial Hospitals I have examined—the windows are short, not reaching to within a number of feet of the ceiling; in consequence of which, the upper stratum of air—supposing the windows opened—does not escape. Moreover, the beds ought to be so arranged along the walls as not to stand directly opposite a window. The lithographed sketch will show how well this is managed in the wards of the Bordeaux Hospital. In many of our Hospitals, if you open a window, the air rushes upon the bed, and that, too, unprotected by curtains.

I have before said that open windows are not always admissible; in certain states of the weather an unrestrained circulation of air would be disagreeable, or even hurtful to the patients. In a number of Hospitals, the windows, by a simple mechanical contrivance, are thrown open to any extent that is thought desirable,—to the width of an inch or of the entire window; but howsoever guardedly this kind of ventilation may be managed, it causes, in stormy weather, draughts, of which the patients are sure to complain, and which they will obviate, when they can, by closing the windows. The difficulty, happily, in this case is not insurmountable. By means of finely perforated zinc plates, the air-currents may be made to percolate into the wards in so subtle a manner as to be robbed of *sensible* draughts, and thus the blessing of pure air be obtained, as it were, by stealth. The use of this invention is, as yet, I imagine, very limited in Hospitals. I am, however, able to describe a beautiful instance of its application I witnessed when last in London.

About half-past seven in the morning of May 16th, 1855, I entered one of the wards of the Middlesex Hospital; the ward had windows facing each other in the opposing side walls, was very lofty, and not over-crowded with patients. I was struck by its freshness, and remarked to my attendant, "This ward is as sweet as a field, I am delighted with the absence of unpleasant smells." He replied, "If it is sweet now it must be sweet at all times, for the patients have not been moved, nor anything done." Before entering the Hospital, I had noticed iron gratings in the external walls; and now, on casting my eye upwards, I found there were, near the ceiling, plates of perforated zinc, corresponding to the gratings without; five such plates, about 10 in. in depth and 15 in. in breadth, in either side wall, facing each other,—in all ten; so that the ward, throughout the night, had partaken of the movements of the external atmosphere:

yet so moderated, by having to pass through the perforated plates, as to be completely robbed of sensible draughts. Moreover, not only were there no draughts, but the great height above the beds at which the admission of air took place, (a point of much importance,) prevented the patients from feeling any sense of chillness by its descent upon them. Here was a beautiful mode of ventilation for the night and for stormy weather, when the windows and doors being, but too often, closely shut, a supply of pure air is especially needed. In calm weather, there can be no objection to the guarded transmission of air by the windows even in the night, especially when a canvas blind or a thin curtain covers the openings, and the beds are protected by light hangings; but when the stormy character of the weather renders this unadvisable, (and in our climate it will often happen,) the contrivance found in a number of the wards of the Middlesex Hospital surely deserves to be universally known and adopted.

Although openings near the ceiling—such as have been described—are much to be preferred to apertures lower down, yet where such openings have not been provided, a substitute for hem may be found, by having one of the upper panes of glass n each of the opposite windows full of small slits to admit air, nd, to moderate the force of the air-current thus admitted, a plate of very finely perforated zinc over the inner surface of ach of the panes.

It will here not be out of place to remark, that a visitor may easily be deceived as to the sweetness of the wards of an Hospital, if he be content to pay his visit in the forenoon, hen official persons are moving about; when everything offenve has been carried away, and when, probably, a number of he windows and doors are open. At this time nothing offends he organ of smell. But let him go in the evening, in the ight, or early in the morning, and then he may chance to ceive a less agreeable impression. I speak from personal perience. Patients when left to themselves (as they generally are at those times when the nurses do not expect the visits of the medical attendants,) are almost certain to close the windows; and during perhaps sixteen hours in the twenty-four—supposing no admission of air beyond what it is in their power to interrupt, and the wards crowded with the surgical class of diseases,—a visitor will find a very different state of things in, at all events, a number of our Hospitals; the inmates restless and feverish, the countenances of all wearing a look of depression, and the air abominable.

I hardly know how to speak concerning the artificial heating of wards. Beyond open fire-places or open stoves, I believe artificial modes of heating to be injurious. In an Hospital expressly designed for diseases of the air-passages and chest, an artificial climate in the winter and spring may, for aught I know, be necessary; this is a point on which I do not raise a discussion, beyond the remark that I am inclined to think that, even as regards this class of patients, some kind of respirator would be better. But, with respect to patients of every other class, plenty of warm clothing, and a cool sweet ward, answer best. When we talk of heating a ward, we are apt to forget that heat promotes the decomposition, the rapid decomposition, of all the excretions produced in so many ways, especially in a ward for surgical patients; that the sick are generally feverish in the evening, if not throughout the day; and that we cannot more certainly increase their discomfort than by surrounding them with an unnaturally *dry*, hot, atmosphere; the temperature of which, too, is sometimes by neglect and mismanagement rendered perfectly tropical.

I have hitherto refrained from alluding to Lying-in Hospitals, but may here be permitted to remark, that the same observations in reference to plan, ventilation, and artificial warming, which I have made concerning Hospitals for the sick and wounded, are applicable in an equal degree to Hospitals for the lying-in; still more applicable I might say, since it is notorious that in perhaps all existing Lying-in Hospitals, the mortality, as respects both the mothers and infants, is higher than that which is found among the poorest class of women confined in their own habitations.

There are various other things, attention to which promotes the salubrity of an Hospital ward; as, for instance, that there be a discharging shaft in the wall, shut by a sliding cover, by which soiled clothes, fouled dressings, and the like, are at once passed to the wash-cellar; that the ceiling and walls be painted and highly varnished, in order to prevent (what is so apt to happen when lime-washing is practised) the imbibition by the plaster of effluvia; as well as that the surface of both ceiling and walls may be readily cleansed. That there be no furniture in the ward beyond what is absolutely necessary; that there be an eating room for convalescents, to avoid in the ward the smell and vapour of cooked food; that, with respect to the persons of the patients and nurses alike, and to every article of clothing and bedding, there be the most scrupulous attention to cleanliness; and, lastly, that the dressers, whether medical students or nurses, be not permitted to carry fouled sponges from patient to patient, as, without a watchful eye over them, they are so apt to do. I need hardly say, that the occasional use of the warm or tepid bath, and at all events, of the foot bath, in the case of both patients and nurses, is most desirable. A single pair of neglected feet even, will, in the night, affect the sweetness of the surrounding air.

In conclusion, I will venture a word concerning the proper site for an Hospital. When a person of sense determines on building a dwelling-house, the salubrity of the site is a point never overlooked; but how rarely in this country do we give the same thing a moment's consideration with reference to an Infirmary! Our fever and general Hospitals are usually built in some populous and central spot of our large towns, selected, as is alleged, that the Hospital may stand conveniently for the medical staff residing around, and that the sick and the hurt may be carried thither with as little delay as possible. These reasons are more specious than weighty; for, assuredly, if a cure is to be obtained, then must the *salubrity* of the Hospital be a primary, not a secondary, consideration. I do not mean, of course, that it is not important that the hurt should receive speedy assistance; they ought to receive assistance with the least possible delay; and, instead of having to be carried directly, in all instances, to an Hospital, there ought to be Accident Rooms conveniently situated—one such room in, for example, each of the larger municipal wards in our populous cities. When walking about Paris, one sees in a number of places written up in large characters the words *Secours aux blessès;* meaning, that *here* accidents are promptly attended to without the sufferers having to be taken, it may be, to a remote Hospital before the wound is dressed, the dislocation reduced, or the broken bone adjusted. With Accident Rooms provided such as these, the only argument worthy of notice for erecting an Infirmary in the centre of a large manufacturing town, enveloped in its cloud of smoke, is satisfactorily disposed of. But, if any should still object, let me remind them that this is a sceptical age regarding the unaided powers of the Materia Medica; that whilst there are many persons very apt to descant on the uncertainty attaching to the results of the most skilful medical practice apart from cleanliness and pure air, there are perhaps none who would not at once concede that a removal of the sick poor from their own cottages and cellars into wards so airy and cheerful as those of the Bordeaux Hospital, confers, in itself alone, the most important benefits; and the medical staff, too, would doubtless, in the case supposed, be the first to applaud arrangements so wisely designed to aid their efforts for the good of their patients. I will add, with respect to the choice of a site, that it ought, if possible, to be on an elevation, to the windward of the city; having a soil naturally dry, or admitting of easy drainage; and that the plot of ground ought to be large enough to include gardens, not merely to please the eye of the sick, but to provide, as well, the means of recreation and exercise for convalescents.

POSTSCRIPT.

Since this Paper was in the hands of the printer, my attention has been drawn to the following instructive passage in Professor Simpson's "Obstetric Memoirs and Contributions," published last year, with reference to the Edinburgh Maternity Hospital and Hospitals in general. Without, perhaps, concurring in all the Professor's recommendations, I cannot but think that the sentiments of so experienced and acute a mind as his, on a subject which so deeply concerns suffering humanity, will be read with interest.

> "The convalescence of the [Maternity] Hospital patients was often interrupted by febrile and inflammatory attacks. The house, 3, St. John-street, used as an Hospital was, in addition to a sunk kitchen flat, three storeys in height, with two rooms in the first and second flats, and three in the third; and it was much too small for the accommodation of the patients, and of the resident house-surgeons, matron, &c. The rooms themselves were low-roofed, and very imperfectly ventilated. Various plans were attempted to improve the ventilation, but not with much success. Whenever the Hospital became in any degree crowded, fevers, (or weeds,) with more or less abdominal tenderness, appeared among the patients; and, frequently, the supervention of such attacks during convalescence became so common, as to constitute the rule rather than the exception to it. Every one acquainted with hospital practice, whether obstetric, surgical, or medical, is well aware of the great liability among the patients to febrile and inflammatory attacks, whenever the wards are over-crowded; and in no practice is this more visible than in midwifery. Indeed, I believe there are few or no circumstances which would contribute more to save surgical and obstetric patients from phlebitic and other analagous disorders, than a total change in the present system of hospital practice.
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> "I have often stated and taught that, if our present medical, surgical, and obstetric hospitals were changed, from being crowded palaces with a layer of sick in each flat, into villages or cottages with one, or at most two patients in each room, a great saving of human life would be effected. And if the village were constructed of iron, (as is now sometimes done for other purposes,) instead of brick or stone, it could be taken down and rebuilt every few years; a matter, apparently, of much moment in hospital hygiene. Besides, the value of the material would not greatly deteriorate from use; the principal outlay would be in the first cost of it. It could be erected in any vacant space or spaces of ground, within or around a city, that chanced to be unoccupied; and, in cases of epidemics, the accommodation could always be at once and readily increased."
> —Pages 856 and 857.

GROUND PLAN OF THE BORDEAUX HOSPITAL.

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